ORIGINAL

Tucson Electric Power Company
One South Church, P.O. Box 711
Tucson, AZ 85702

April 29, 2011

Docket Control
Arizona Corporation Commission
1200 West Washington
Phoenix, Arizona 85007

Re: Decision No. 69680, Docket No. L-00000C-95-0084-00000
2010 Annual Summer Preparedness Report

Enclosed please find Tucson Electric Power Company's ("TEP") annual summer preparedness report that documents the ability of TEP's Green Valley area 46 kV system to timely restore service to: a) all customers served from Green Valley Substation and Canoa Ranch Substation following outage of the 138 kV South to Green Valley line outage; b) applicable load of UNS Electric, Inc. ("UNS Electric") customers via the 46 kV tie from Canoa Substation to Cañez Substation for an outage of the UNS Electric 115 kV line to Nogales; and c) all TEP customers and applicable load of UNS Electric customers for the concurrent outage of the South to Green Valley 138 kV line and the UNS Electric 115 kV line to Nogales. TEP is filing this report in accordance with Decision No. 69680 (July 6, 2007), Docket No. L-00000C-95-0084-00000, which modified the Certificate of Environmental Compatibility granted in Decision No. 59221 (August 8, 1995).

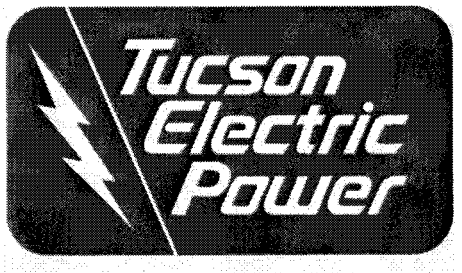
If you have any questions regarding the report, please do not hesitate to contact me at (520) 884-3680.

Sincerely,

Jessica Bryne

Jessica Bryne
Regulatory Services

cc: Prem Bahl, ACC
Compliance, ACC
Shannon Kanlan, ACC



A UniSource Energy Company

2011 Green Valley and Kantor Substation Summer Preparedness

Prepared By:
Tucson Electric Power Company

April 2011

EXECUTIVE SUMMARY

Transmission Planning for Unisource Energy Corporation has evaluated the ability for existing transmission and sub-transmission facilities to serve load in the community of Green Valley and load served out of the Kantor substation in Santa Cruz County. As a result of evaluating contingencies involving an outage of Tucson Electric Power Company's ("TEP")138 kV transmission, or UNS Electric, Inc. 's ("UNSE") 115 kV transmission, it has been determined that area transmission and distribution systems are able to adequately serve load in the areas supplied by the Green Valley and new Canoa Ranch substations (TEP) and Kantor substation (UNSE) for the 2011 summer peak load period. Future plans in the Green Valley area are included in the TEP and UNSE 10 Year Plans that were filed with the Arizona Corporation Commission in January 2011.

BACKGROUND

Green Valley

Green Valley's power delivery needs are met by 138 kV transmission and 46 kV distribution circuits originating at TEP's South substation (Exhibit A). The 138 kV circuit is a radial transmission line serving the following substations:

- Green Valley T3 138/13.8 kV, 50.0 MVA, 65.0 MVA Emergency
- Canoa Ranch T1 138/13.8 kV, 50.0 MVA, 65.0 MVA Emergency

The 46 kV system is comprised of two 46 kV distribution circuits, 46-C-550 (rated 49 MVA) and 46-C-552 (rated 49 MVA). The TEP transformers served by this distribution, and available to back-up loss of the 138 kV circuit, include:

46-C-550

- Green Valley T1 46/13.8 kV, 25.0 MVA, 30.0 MVA Emergency
- Green Valley T2 46/13.8 kV, 25.0 MVA, 30.0 MVA Emergency

46-C-552

- Canoa T1 46/13.8 kV, 4.7 MVA, 5.6 MVA Emergency
- Cyprus Esparanza T2 46/13.8 kV, 14.4 MVA, 14.4 MVA Emergency (new since 2009)
- Raw Water Supply T3 46/13.8 kV, 9.4 MVA, 11.3 MVA Emergency

The two 46 kV transformers at Green Valley (T1 & T2) are used strictly as back-up and are not loaded under normal conditions. Both of these units have been re-wound within the past two years and are in service.

Work was performed in 2011 to increase the capacity of the existing 138 kV radial from 227 MVA to 309 MVA which is a conductor thermal limit. This well exceeds the total forecast 138 kV circuit loading of 48.6 MVA at the Green Valley and Canoa Ranch substation.

Kantor

Kantor substation is one of four substations serving UNSE load in Santa Cruz County. This station is served by the 115 kV radial transmission line supplied by the WAPA Nogales substation. For loss of this line, the load at Kantor can be picked up via an existing 46 kV tie, 46C552, served from TEP's South substation. The rating of this 46 kV circuit it 49 MVA. The transformer capacity at Kantor is 12.5 MVA. Expected load on 46C552 is 29.7 MVA including the Kantor load. Therefore the net 46 kV system capacity exceeds the projected peak demand.

CONTINGENCY OPERATION

Green Valley

As seen in Table 1, there is adequate capacity on the underlying 46 kV system to back up load in Green Valley for loss of the South to Green Valley 138 kV radial transmission line in 2011. This is based on the fact that the load at the Green Valley substation is transferred to the 46 kV system via 46/13.8 kV transformation that exists at the station for this purpose. Load at the new Canoa Ranch substation will in-turn be picked up via distribution ties back to the Green Valley substation

Table 1: 46 kV Margin to Back-up Loss of Green Valley 138 kV

Substation	Rating	2011 Load	Available Capacity to Support loss of 138kV[1]
Cyprus Esparanza Wells-T1 (mine)	3.1	0.5	N/A
Canoa-T2 (mine)	3.1	1.7	N/A
Cyprus Raw Water Booster-T1 (mine)	4.7	2.6	N/A
Cyprus Raw Water Supply-T1 (mine)	8.8	2.8	N/A
Green Valley-T1	25.0	0.0	25
Green Valley-T2	25.0	0.0	25
Canoa-T1	4.7	3.3	1.4
Cyprus Esparanza Wells-T2	14.4	11.0	3.4
Cyprus Raw Water Supply-T3	9.4	0.0	9.4
Total 46 kV Xfmr Capacity available to back up 138 kV			64.2
Total 138 kV Circuit Loading		48.6	48.6
46 kV Xfmr Capacity Margin		20.6	15.6

The worst contingencies regarding the Green Valley area involve loss of one or both of the 345/138 kV transformers at the South substation. Neither the N-1, or the N-2, contingency causes any overloads above the emergency rating on the remaining 138kV system. In addition, the N-1 contingency does not result in any elements becoming loaded above their continuous rating which indicates an ability to system adjust to achieve normal operating conditions in anticipation of additional outages. Table 2 demonstrates that there are no voltage violations greater than 5% for loss of one transformer or greater than 10% for loss of both transformers.

Table 2: Green Valley Area 138 kV Contingency Voltage Deviations

Green Valley Area 138 kV Contingency Voltage Deviations						
	South		Green Valley		Canoa Ranch	
	V	delta V	V	delta V	V	delta V
ALIS	1.032	0.00%	1.028	0.00%	1.028	0.00%
South-T1	1.030	0.19%	1.026	0.19%	1.026	0.19%
South-T1 + T2	0.996	3.49%	0.991	3.60%	0.991	3.60%

[1] Mine transformer excess capacity not considered by TEP.

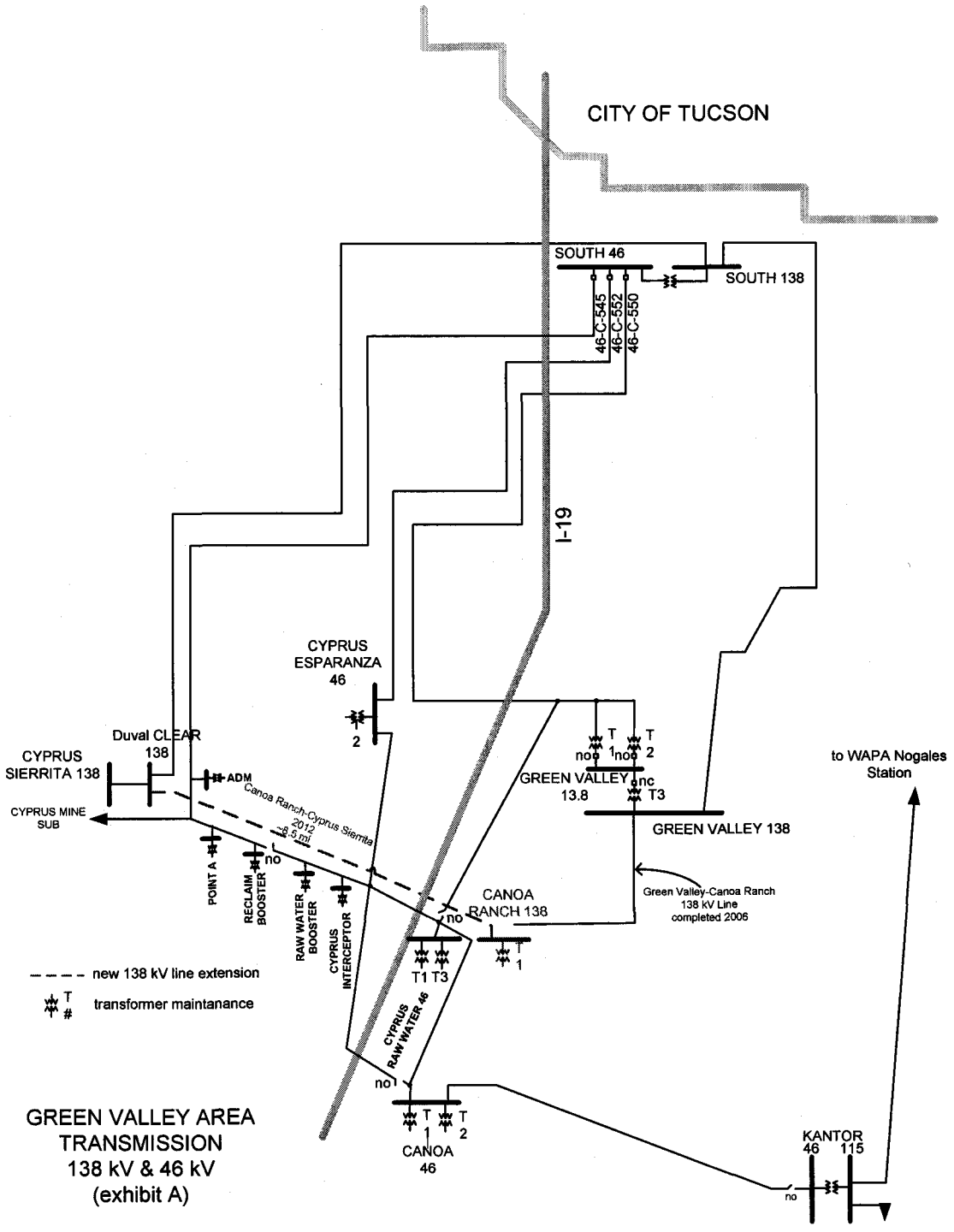
Kantor

The TEP 46 kV circuit 46C552, served from South substation, is used to back up the Kantor substation for loss of the 115 kV radial serving Santa Cruz county. The 46 kV circuit is rated at 49 MVA and also serves Cyprus Esparanza Wells, Canoa, Cyprus Raw Water Booster, Cyprus Raw Water Supply and Cyprus Point A. The remaining capacity available after backing up Kantor is shown as "46C552 Margin" in the following table:

Table 3: 46C552 kV Loading

Substation	Rating	2011 Load
Cyprus Esparanza Wells-T1 (mine)	3.1	0.5
Canoa-T2 (mine)	3.1	1.7
Cyprus Raw Water Booster-T1 (mine)	4.7	2.6
Cyprus Raw Water Supply-T1 (mine)	8.8	2.8
Canoa-T1	4.7	3.3
Cyprus Esparanza Wells-T2	14.4	11.0
Cyprus Raw Water Supply-T3	9.4	0.0
Kantor	12.5	7.8
46C552 Line Load w/ Kantor	49	29.7
46C552 Line Margin		19.3
46C552 Margin w/ Green Valley 138 OOS		5.1

It is clear from Table 3 above that there is adequate capacity to serve the native Canoa and Cyprus load as well as Kantor for loss of the 115 kV circuit even after loss of the 138 kV circuit (N-1 and N-1-1 contingencies respectively). The last row in Table 3 assumes that, for the South-Green Valley 138 kV line out-of-service, non-mine 46 kV transformers are fully loaded to back–up Green Valley and therefore the increased loading on 46C552 reduces the margin on that line.


CITY OF TUCSON
SOUTH 46
SOUTH 138
46-C-545
46-C-552
46-C-550
I-19
CYPRUS ESPARANZA 46
2
Duval CLEAR 138
CYPRUS SIERRITA 138
ADM
Canoa Ranch-Cyprus Sierrita 2012 ~6.5 mi
CYPRUS MINE SUB
POINT A
RECLAIM BOOSTER
RAW WATER BOOSTER
CYPRUS INTERCEPTOR
no
T 1 no
T 2 no
GREEN VALLEY 13.8
nc
T3
GREEN VALLEY 138
to WAPA Nogales Station
Green Valley-Canoa Ranch 138 kV Line completed 2006
CANOA RANCH 138
T 1
T1 T3
CYPRUS RAW WATER 46
new 138 kV line extension
T # transformer maintanance
T 1
T 2
CANOA 46
KANTOR 46 115
GREEN VALLEY AREA TRANSMISSION 138 kV & 46 kV (exhibit A)